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Groups And Symmetry (Undergraduate Texts In Mathematics)

Undergraduate Texts in Mathematics

M.A. Armstrong

Groups and Symmetry

Springer
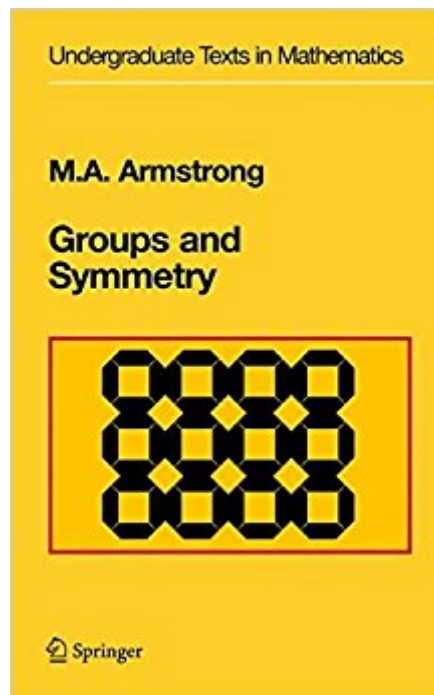
Synopsis

This is a gentle introduction to the vocabulary and many of the highlights of elementary group theory. Written in an informal style, the material is divided into short sections, each of which deals with an important result or a new idea. Includes more than 300 exercises and approximately 60 illustrations.

Book Information

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Customer Reviews

M.A. Armstrong Groups and Symmetry "This book is a gentle introductory text on group theory and its application to the measurement of symmetry. It covers most of the material that one might expect to see in an undergraduate course . . . The theory is amplified, exemplified and properly related to what this part of algebra is really for by discussion of a wide variety of geometrical phenomena in which groups measure symmetry. Overall, the authorÃ¢ ¬â„¢s plan, to base his treatment on the premise that groups and symmetry go together, is a very good one, and the book deserves to succeed."Ã¢â ¬â ¢MATHEMATICAL REVIEWS

I used this book for my introductory group theory class (Math 109 at Stanford). The book is alright, but the entire thing is written in the style of a proof. Theorems are introduced, then promptly proven. As a result, the exercises are often dramatically more difficult than material covered in the corresponding chapters. Another result of this style is extreme concision. Be prepared to read every

sentence twice. This is a good book, but be comfortable with proofs and discrete math before attempting to read it.

It begins with nonisomorphic groups of order 12, but in a totally relaxed manner as an investigation into symmetries of different types of objects. Then you see subgroups and the center, etc in a very concrete way. This is a fun way to approach group algebra.

Armstrong is ridiculously laconic. He also writes as if you're fluent in the language of abstract pure mathematics. He also assumes you remember theorems proved in homework exercises and uses them in the main text of later chapters. Do yourselves a favor and take an intermediate level algebra course before picking up this book (if you even have to pick up this book, which I wouldn't have, but it was required for my course). Applications happen on a rare basis, until the last handful of chapters. Worse still, Armstrong decides to only allude (at most) to scientific applications of the material, and instead focuses the "applied" chapters on things such as block problems (how many blocks can be produced if you have two colors of paint and paint pattern x) and wallpaper patterns (whereas he could have focused on the numerous applications of group theory to chemistry and even physics). Don't let the easy going and easy to understand first 3 or 4 chapters fool you, this is really a poor text except perhaps for those who already know group theory, know high level algebra, and just want a book explaining the intersections in a not-so-rigorous, often hand-wavy way (this also adds to frustration because your professor will probably tell you your proof is weak if you mimic the proofs in the chapter text).

I used the group theory text as an undergraduate mathematics major. I found the book to be unhelpful from organizational, pedagogical, and motivational perspectives. The book tries to motivate the reader with practical examples, but these examples are fairly run of the mill and most professors have a slew of far more interesting examples. If I had to learn group theory only from this book I would have gone insane. The author does not setup a sense of how various ideas fit into the larger picture and does a poor job motivating theorems with intuitive reasoning. Many proofs are simply stated without true intuitive cognition.This book is not the fantastic learning guid that it's sister book, Understanding Analysis by Stephen Abbot. Abbot's book provides good insight into the subjects theoretical core helping build intuition for the subject. Group theory is a subject that can be presented in such a manner, but this book simply does not provide.As a reference text this is also poor. Many crucial proofs are given as exercises and the book's layout and structure are not

conducive to finding what you're looking for.Bad text to learn from and a bad reference. As with war, what is this good for?

good

This book is a trip, man....

Some authors like to expound, some like to dazzle and some like to teach. Armstrong falls easily into the latter category. If you are looking for a clear and motivating book to start learning about group theory, you will not find a better book. It is a short book but covers the essentials. The range of topics covers the necessary ground for an introduction: Sylow's theorems, free groups, matrix groups, presentations are all there with a strong geometric content. He even proves the Nielsen-Schrier Theorem in an accessible manner. All you really need to know is some basic undergraduate algebra to understand this little gem and it will certainly give you the foundation to move deeper. Highly recommended for a starting point.

This was the textbook for my first course in abstract algebra and the first "yellow book" that I read. I found it an excellent book: rather than starting with axioms and dryly deriving everything, it gets one to contemplate the meaning and motivation behind the axioms. This book will encourage you to play around with mathematics on paper and in your mind, helping you to get a concrete feel for a subject that many people view as painfully abstract.The prose is clear and well-written: there is just the right amount of discussion to elucidate necessary points, while allowing the book to remain fairly compact. Exercises are fun but difficult and many require genuine creativity.I also really like the choice of topics: although this book is introductory (with respect to abstract algebra, it presupposes some knowledge of linear algebra), because it focuses only on groups (as opposed to also trying to handle rings & fields) it is able to get into some more advanced and very interesting topics and applications in later chapters. This book will give you a lot more than can be covered in a single semester undergrad course, and while it doesn't exactly make the best reference text, it will be a book you will want to keep coming back to, if only to study some of the more advanced material.There are differing perspectives on the teaching of abstract algebra: some people like to start with group theory exclusively in a first course, and treat rings, fields, and other structures in later courses. Other people recommend more integrated approaches, or approaches starting from rings. While I can't say that either approach is better, I can say that this book takes the first

approach, focusing exclusively on groups and assuming little prior background..and for a first course in abstract algebra, this book is an excellent choice.

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